

6-1 Practice

Proportions

1. **NUTRITION** One ounce of cheddar cheese contains 9 grams of fat. Six of the grams of fat are saturated fats. Find the ratio of saturated fats to total fat in an ounce of cheese.

2:3

2. **FARMING** The ratio of goats to sheep at a university research farm is 4:7. The number of sheep at the farm is 28. What is the number of goats?

$$\frac{4}{7} = \frac{x}{28} \quad x = 16$$

3. **ART** Edward Hopper's oil on canvas painting *Nighthawks* has a length of 60 inches and a width of 30 inches. A print of the original has a length of 2.5 inches. What is the width of the print?

$$\frac{1}{w} = \frac{60}{30} = \frac{2.5}{w} \quad w = 1.25 \text{ in}$$

Solve each proportion.

$$4. \frac{5}{8} = \frac{x}{12} \quad 7.5$$

$$5. \frac{x}{1.12} = \frac{1}{5} \quad .224$$

$$6. \frac{6x}{27} = \frac{4}{3} \quad 6$$

$$7. \frac{x+2}{3} = \frac{8}{9} \quad \begin{aligned} 3x+6 &= 8 \\ 3x &= 2 \\ x &= \frac{2}{3} \end{aligned}$$

$$8. \frac{3x-5}{4} = \frac{-5}{7} \quad \begin{aligned} 21x-35 &= -20 \\ 21x &= 15 \\ x &= \frac{15}{21} = \frac{5}{7} \end{aligned}$$

$$9. \frac{x-2}{4} = \frac{x+4}{2} \quad \begin{aligned} x-2 &= 2x+8 \\ -10 &= x \end{aligned}$$

Find the measures of the sides of each triangle.

10. The ratio of the measures of the sides of a triangle is 3:4:6, and its perimeter is 104 feet.

$$3x+4x+6x=104 \quad x=8 \quad 24\text{ft}, 32\text{ft}, 48\text{ft}$$

11. The ratio of the measures of the sides of a triangle is 7:9:12, and its perimeter is 84 inches.

$$7x+9x+12x=84 \quad x=3 \quad 21\text{in}, 27\text{in}, 36\text{in}$$

12. The ratio of the measures of the sides of a triangle is 6:7:9, and its perimeter is 77 centimeters.

$$6x+7x+9x=77 \quad x=3.5 \quad 21\text{cm}, 24.5\text{cm}, 31.5\text{cm}$$

Find the measures of the angles in each triangle.

13. The ratio of the measures of the angles is 4:5:6.

$$4x+5x+6x=180 \quad x=12 \quad 48^\circ, 60^\circ, 72^\circ$$

14. The ratio of the measures of the angles is 5:7:8.

$$5x+7x+8x=180 \quad x=9 \quad 45^\circ, 63^\circ, 72^\circ$$

15. **BRIDGES** The span of the Benjamin Franklin suspension bridge in Philadelphia, Pennsylvania, is 1750 feet. A model of the bridge has a span of 42 inches. What is the ratio of the span of the model to the span of the actual Benjamin Franklin Bridge?

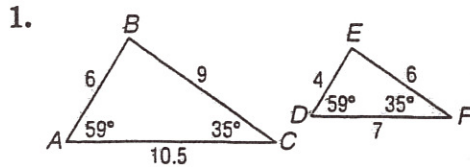
$$\frac{42}{1750 \times 12} = \frac{1}{500}$$



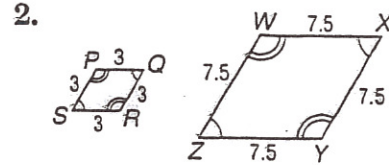
6-2 Skills Practice

Similar Polygons

Determine whether each pair of figures is similar. Justify your answer.



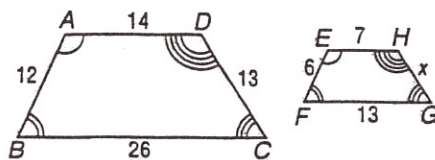
yes AA~
or SSS~ $\frac{6}{4} = \frac{9}{6} = \frac{10.5}{7} \checkmark$
or SAS~



yes $\angle s \cong$
Sides proportional
 $\frac{3}{7.5} = \frac{3}{7.5} = \frac{3}{7.5} = \frac{3}{7.5} \checkmark$

Each pair of polygons is similar. Write a similarity statement, and find x , the measure(s) of the indicated side(s), and the scale factor.

3. \overline{GH}



$ABCD \sim EFGH$

S.F. 2:1

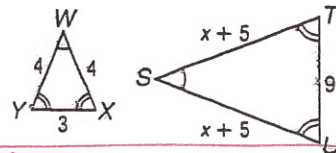
$$\frac{2}{1} = \frac{13}{x}$$

$GH = 6.5$

$2x = 13$

$x = 6.5$

4. \overline{ST} and \overline{SU}



$ST = 12$
 $SU = 12$

$\triangle WYX \sim \triangle SUT$ (or $\triangle STU$)

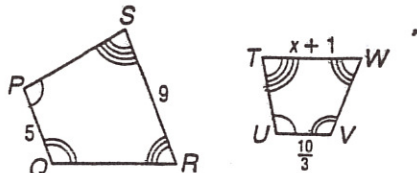
S.F. 1:3

$$\frac{1}{3} = \frac{4}{x+5}$$

$x+5=12$

$x=7$

5. \overline{WT}



$PQRS \sim UVWT$

S.F. 3:2

$$\frac{5}{10/3} = \frac{9}{2} = \frac{3}{2}$$

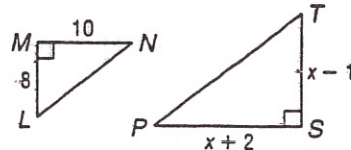
$$\frac{3}{2} = \frac{9}{x+1}$$

$x+1=6$

$x=5$

$WT = 6$

6. \overline{TS} and \overline{SP}



$\triangle MNL \sim \triangle TSP$

$TS = 12$
 $SP = 15$

$$\frac{8}{12} = \frac{10}{x+2}$$

$x=1$ $x+2$

$4x+8 = 5x-5$

$13 = x$

S.F. 2:3

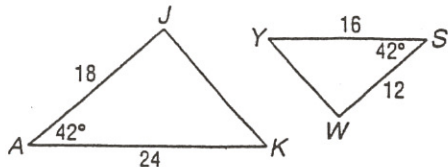
$$\frac{8}{12} = \frac{2}{3}$$

6-3 Practice

Similar Triangles

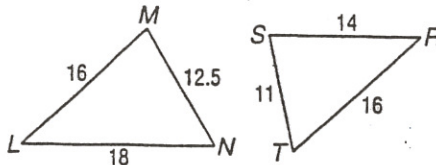
Determine whether each pair of triangles is similar. Justify your answer.

1.



$$\frac{18}{12} = \frac{24}{16} \checkmark \quad \text{SAS} \sim$$

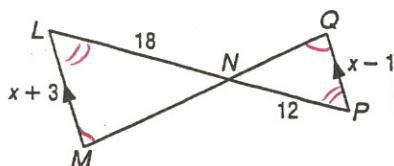
2.



$$\frac{12.5}{11} = \frac{16}{14} = \frac{18}{16} \quad \text{NO}$$

ALGEBRA Identify the similar triangles, and find x and the measures of the indicated sides.

3. \overline{LM} and \overline{QP}



$$\triangle LMN \sim \triangle PQR$$

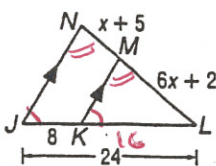
$$\frac{18}{12} = \frac{x+3}{x-1}$$

$$2x+6 = 3x-3$$

$$9 = x$$

$$\begin{aligned} LM &= 12 \\ QP &= 8 \end{aligned}$$

4. \overline{NL} and \overline{ML}



$$NL = 21$$

$$ML = 14$$

$$\triangle KML \sim \triangle JNL$$

$$\frac{21}{3} = \frac{6x+2}{7x+7}$$

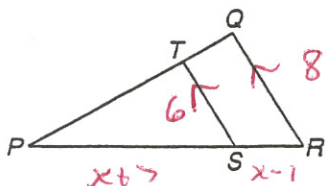
$$18x+6 = 14x+14$$

$$4x = 8$$

$$x = 2$$

Use the given information to find each measure.

5. If $\overline{TS} \parallel \overline{QR}$, $TS = 6$, $PS = x + 7$, $QR = 8$, and $SR = x - 1$, find PS and PR .



$$PS = 12$$

$$PR = 16$$

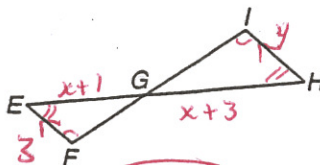
$$\frac{6}{8} = \frac{x+7}{x-1}$$

$$6x+18 = 4x+28$$

$$2x = 10$$

$$x = 5$$

6. If $\overline{EF} \parallel \overline{HI}$, $EF = 3$, $EG = x + 1$, $HI = 4$, and $HG = x + 3$, find EG and HG .



$$EG = 6$$

$$HG = 8$$

$$\triangle EFG \sim \triangle HIG$$

$$\frac{3}{4} = \frac{x+1}{x+3}$$

$$4x+4 = 3x+9$$

$$x = 5$$

INDIRECT MEASUREMENT For Exercises 7 and 8, use the following information.

A lighthouse casts a 128-foot shadow. A nearby lamppost that measures 5 feet 3 inches casts an 8-foot shadow.

7. Write a proportion that can be used to determine the height of the lighthouse.

$$\frac{x}{128} = \frac{5\frac{3}{4}}{8}$$

8. What is the height of the lighthouse?

$$84\text{ ft}$$

